

Claims

1. Transducer that works with surface acoustic waves and contains:  
an acoustic spur (AS) that has electrode fingers of different electrodes (E1, E2)  
5 that engage one another,

whereby in the acoustic spur (AS) an acoustic wave is excitable that is  
characterized by a transversal basic mode,

whereby the acoustic spur (AS) is divided in the transversal direction (Y) into an  
excitation area (MB) and two marginal areas (RB1, RB2),

10 whereby the longitudinal phase speed of the acoustic wave in a marginal area  
(RB1, RB2) is less than in the excitation area (MB),

whereby for the wave number  $k_y$  of the transversal basic mode the following  
applies:

$(k_y)^2 > 0$  in a marginal area (RB1, RB2) and

15  $(k_y)^2 < 0$  in an exterior area (AU1, AU2) outside the acoustic spur (AS),

whereby in the excitation area (MB)  $k_y$  is numerically substantially smaller than  
in the marginal areas (RB1, RB2) and the exterior areas (AU1, AU2).

2. Transducer in accordance with claim 1, in which  $k_y = 0$  in the excitation area  
20 (MB).

3. Transducer in accordance with claim 1, in which the excitation area (MB) is  
divided in the transversal direction (Y) into several partial spurs (TB1, TB2, TB3, TB4)  
that correspond to partial transducers that are switched to one another in series and/or in  
25 parallel.

4. Transducer in accordance with claim 3,  
whereby the partial spurs are designed identically in the longitudinal direction (X)  
up to their width,

whereby the width of the partial spurs is selected so that the transversal profile  $\Psi_y$  of the excitation strength in the excitation area (MB) is adapted to the shape  $\Phi_y$  of the transversal basic mode.

5        5. Transducer in accordance with claim 3 or 4, in which the following applies for adapting the transversal profile  $\Psi_y$  of the excitation strength to the shape  $\Phi_y$  of the transversal basic mode:

$$\int \Psi_y \Phi_y \, dy / \sqrt{\int \Psi_y^2 \, dy \cdot \int \Phi_y^2 \, dy} \geq 0.9.$$

10        6. Transducer in accordance with any of claims 3 through 5, in which the partial spurs have a center partial spur (MT) and two marginal partial spurs (RT1, RT2), whereby the marginal partial spurs (RT1, RT2) are switched in series with one another and form a serial circuit, whereby the serial circuit is switched parallel to the center partial spur (MT), whereby the width of the center partial spur (MT) is greater than the width of the marginal partial spur (RT1, RT2) by at least a factor of 5.

15        7. Transducer in accordance with any of claims 1 through 6, in which the marginal areas (RB1, RB2) are each designed as a continuous metal strip in the longitudinal direction with a transversal width of  $\lambda_y/4$ .

20        8. Transducer in accordance with any of claims 1 through 6, in which the number of the electrode fingers per unit of length in the marginal areas (RB1, RB2) is greater than in the excitation area (MB).

25        9. Transducer in accordance with any of claims 1 through 8, in which the electrode fingers of different electrodes (E1, E2) are arranged in the excitation area (MB) on a periodic grid.

10. Transducer in accordance with any of claims 1 through 8, in which the excitation area (MB) in the longitudinal direction is divided into unidirectionally radiating or reflecting cells,

5 whereby several electrode fingers in the excitation area (MB) that are arranged adjacent to one another in the longitudinal direction form a cell with radiation of the acoustic wave in a preferred direction or a cell with a reflecting effect.

10. 11. Transducer in accordance with any of claims 1 through 10, in which, in addition to the first acoustic spur (AS), at least one additional acoustic spur (AS') is provided that is divided into an excitation area (MB') and marginal areas (RB1', RB2'), and is constructed largely identical to the first acoustic spur (AS),

whereby the acoustic spurs (AS, AS') are arranged parallel to one another,

whereby an intermediate area (ZB) is arranged between two acoustic spurs,

15 whereby the widths of the marginal areas (RB1, RB2, RB1', RB2') of the acoustic spurs (AS, AS') are selected so that the wave number  $k_y$  in the intermediate area (ZB) is numerically smaller by at least one order of magnitude than in the marginal areas (RB1, RB2) and in the exterior areas (AU1, AU2),

whereby the phase speed in the excitation areas (MB, MB') of different acoustic spurs (AS, AS') and in the intermediate area (ZB) is essentially the same.

20 12. Transducer in accordance with claim 1, in which the number of electrode fingers per unit of length in the intermediate area (ZB) is essentially equal to the number of electrode fingers per unit of length in the excitation areas (MB, MB') of different acoustic spurs (AS, AS').

25 13. Transducer in accordance with claim 12, in which the electrode fingers in the intermediate area (ZB) are arranged on a periodic grid.

30 14. Transducer in accordance with any of claims 1 through 13,

whereby the width of a marginal area (RB1, RB2) in the transversal direction is essentially  $\lambda_y/4$ ,

whereby  $\lambda_y$  is the wavelength of the transversal basic mode in the corresponding marginal area (RB1, RB2).

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15. Filter with at least one transducer in accordance with claims 1 through 14.